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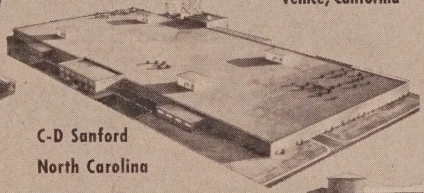

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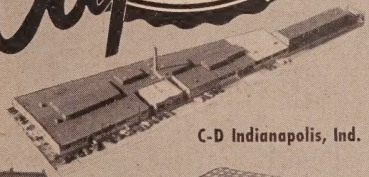

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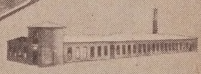

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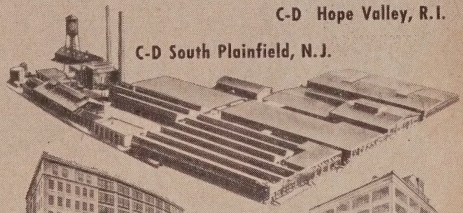

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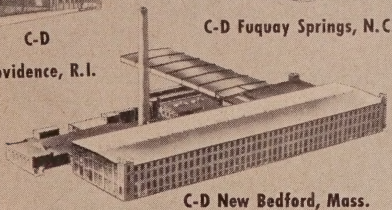

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Vol. 23 JULY - AUGUST, 1958 No. 6

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WIRED-RADIO CONTROL CIRCUITS

Wired-radio, or **carrier-current,** systems are used in both communications and control applications. The r-f signals are transmitted and received over the power lines. Since the signals normally are not radiated, no transmitting license is required. Wired radio has both serious and hobby applications.

Wired-radio communications covers a wide field ranging from the "over-the-line" telephone systems of the electric power companies to the simple intercoms, used in homes and offices, for which no special lines need be strung. Similarly, wired-radio control systems permit a wide variety of remotely-located devices to be turned on or off from a convenient control point. This article is concerned only with the non-commercial control function of wired radio.

In simple control systems, the stand-by receiver operates a relay when energized by the control signal. The relay, in turn, switches the a-c power to the controlled device. When the power required by the controlled device exceeds the contact ratings of the receiver relay, the latter is made to actuate a heavier slave relay. For interaction, the transmitter and receiver simply are plugged into the same power line.

Some of the jobs which can be done with simple wired-radio control include door and gate opening, lamp switching, receiver switching, operation of remote counter, alarm operation, motor control, etc. In short, the scope of application includes virtually any operation which can be performed through the opening and closing of a relay.

The radio frequency employed in carrier-current operation must be low enough to prevent appreciable radiation from the power lines or interference to radio reception by transmission through receiver power supplies. Frequencies in the range 40 to 200 kc commonly are used. All equipment described in this article is designed for 50-kc operation, although the transmitters and receivers each may be tuned somewhat lower and higher than this frequency.

Two simple transmitter and two receiver circuits are described in this article. The r-f power output of the transmitters is low enough to forestall unauthorized radiation of signals from the power line, but high enough to operate the receivers reliably under average conditions of use. While these are not the only circuits which may be employed for wired-radio control, their simplicity and reliability are to be recommended.

Transmitter Circuits

Transformer - Coupled Circuit. See Figure 1. This transmitter employs a triode-connected 6AQ5 tube in a self-excited Hartley oscillator circuit. A fixed tank capacitor (C_2) and slug-tuned tank coil (L_2) are provided. Radio-frequency output is delivered to the power line by the coupling coil, L_1, which consists of 5 turns of insulated hookup wire wound tightly around the outside of L_2. Blocking capacitor C_1 prevents short-circuit of

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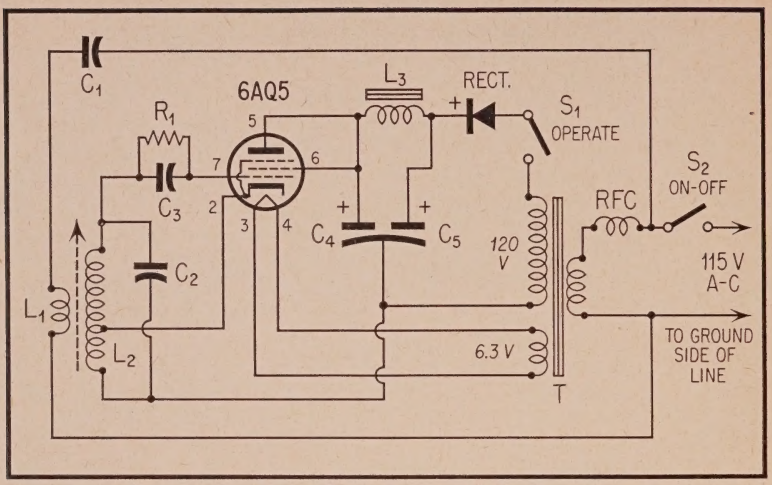


Fig. 1. Transformer-Coupled Wired-Radio Transmitter.

the power line by L_1 while providing easy transmission of the 50-kc energy. (The 60-cycle reactance of C_1 is 26,000 ohms, while the 50-kc reactance is only 26 ohms). The line radio-frequency choke coil, RFC, blocks the path of the r-f output currents back through the primary of power transformer T.

D-C power for the plate and screen of the tube is provided by a simple half-wave power supply (T-RECT-L_3-C_4-C_5). The transmitter is placed into operation to control the distant receiver by depressing pushbutton switch S_1.

The transmitter is tuned to 50 kc by adjustment of the slug of coil L_2. A wavemeter, heterodyne frequency meter, or low-frequency c-w receiver may be used to check the operating frequency. For 50 kc, the inductance of L_2 is set approximately to 2 millihenries.

Transformerless Circuit. See Figure 2. The power transformer is dispensed with in this Hartley oscillator circuit. D-C power for the plate and screen of the triode-connected 50C5 tube is obtained from the selenium rectifier, RECT, operated directly from the a-c power line. Filtration is provided by resistor R_3 and capacitor C_3. The 50-volt filament of the tube is operated from the line through dropping resistor R_4.

This transmitter employs the principal outlined by Warner Clements.[1] Here, the power line and the input circuit of the remote receiver are included in the series-resonant tank circuit (L-C_1) of the transmitter. The circulating r-f tank current thus flows over the line and through the receiver. The transmitter is tuned by adjustment of the slug of coil L. The frequency 50 kc is reached when the inductance of L is set approximately to 2 milli-

henries. The transmitter is placed into operation to control the remote receiver by depressing pushbutton switch S_1.

Radio-frequency choke coil RFC_1 blocks the path of transmitted energy back into the d-c power supply section. Similarly, radio-frequency choke coil RFC_2 blocks the path of transmitter output back through the filament of the tube.

Since this circuit is transformerless, it can constitute a shock hazard. For this reason, no part of the circuit should be connected to the chassis or metal housing of the transmitter. In some instances, the greater simplicity and smaller size of this transmitter will cause it to be preferred to the bulkier transformer-type unit shown in Figure 1.

Receiver Circuits

Both receivers use semiconductor elements rather than tubes. This promotes greater reliability by removing the possibility of tube burnout. The diode-type circuit (Figure 3) draws no standby current at all. The diode-and-transistor circuit (Figure 4) draws very little standby current.

Diode-Type. This circuit employs a simple crystal detector and a sensitive, microammeter-type d-c relay. The diode is a high-conductance type (Hughes HD2150).

The circuit is pre-tuned by means of the slug-type coil, L. Tuning is broad, since the power line is connected across the tuned circuit through blocking capacitor C_2. The circuit is tuned roughly to 50 kc when the inductance of L is set to 5 millihenries.

The high sensitivity of this circuit is provided by the sensitivity of the relay, RY. The latter is a "Sensitrol" type relay having a permanent-magnet stationary contact. The magnetic contact attracts the movable contact and holds it in closure until the contacts

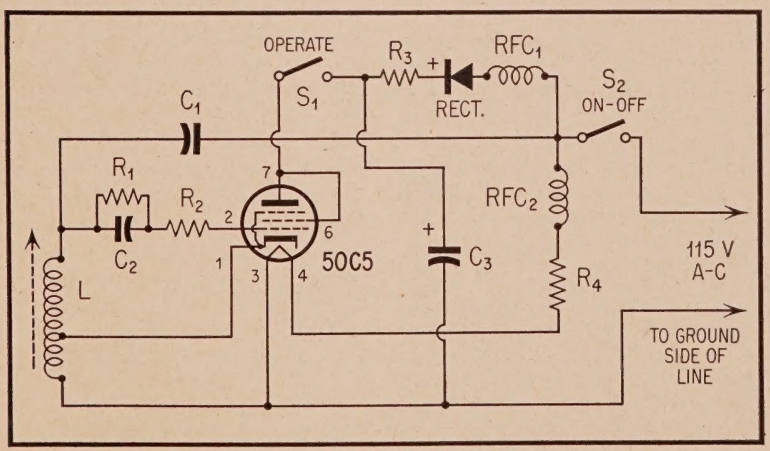


Fig. 2. Transformerless Wired-Radio Transmitter.

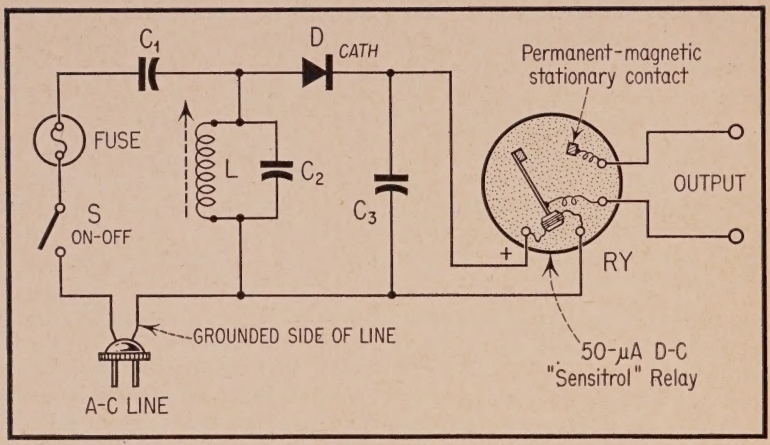


Fig. 3. Diode-Type Wired-Radio Receiver.

are separated by a manual or electrical re-set mechanism. This circuit is satisfactory only for non-repetitive applications such as door-opening, where the subsequent manual closing of the door can be used to re-set the relay.

While the magnetic hold-in, meter-type relay is high-priced (unless found in surplus), its use is justified by the reliability of this device and its high sensitivity which replaces amplifiers in the circuit. An additional advantage is the positive hold-in action which resists vibration, a feature which would not be obtained in a conventional meter-type relay without the magnetic stationary contact.

Diode-Transistor Circuit. See Figure 4. In this receiver circuit, a heavier, milliampere-type d-c relay is operated by a single transistor d-c amplifier which receives its d-c signal excitation from the output of a diode detector. The relay, RY, is a 2-ma, 8000-ohm unit.

Here, tuning is accomplished by adjustment of the slug of coil L_2. R-F energy transmitted over the power line is coupled into the tuned circuit, L_2-C_2, through L_1 which consists of 10 turns of No. 20 d. c. c. wire close-wound around the outside of L_2. Blocking capacitor C_1 prevents short circuit of the power line through L_1, while affording relatively easy passage to the r-f signal current. Resistor R_1 and capacitor C_3 form a simple filter for attenuation of any line-frequency energy which might be coupled in from the power line along with the received r-f signal.

Collector d-c voltage is furnished by a line-operated power supply consisting of 6.3-volt transformer T, diodes D_2 and D_3, and capacitors C_4 and C_5. The power supply circuit is a voltage doubler which, at the low drain of the transistor, has an output of approximately 17 volts dc. Until the actuating signal is received and diode D_1 delivers current, the

transistor collector current is only a few microamperes.

When the relay closes, 6.3 volts ac from transformer T are delivered to the OUTPUT terminals. This voltage may be employed to operate an auxiliary heavy-duty relay or directly to sound an alarm or operate any other 6-volt a-c device.

R-F choke coil, RFC, prevents short circuit of the r-f signal by blocking the passage of r-f currents into the primary winding of transformer T.

Operating Notes

The first question usually asked about amateur wired-radio control equipment is: "What is the operating range?" Unfortunately, there is no pat answer. The power line represents a low and variable impedance. It is particularly low when several appliances or lamps are in operation simultaneously. The greater the number of such appliances in use, the more difficult it becomes to develop a useful r-f voltage across the line. However, tests indicate that any combination of the transmitter and receiver circuits shown in this article will give consistently reliable operation throughout a small building. How far the range can be extended down the neighborhood depends upon many variables such as the length of the intervening line, whether the power lines are overhead or underground (overhead lines tend to give longer-distance operation, probably because

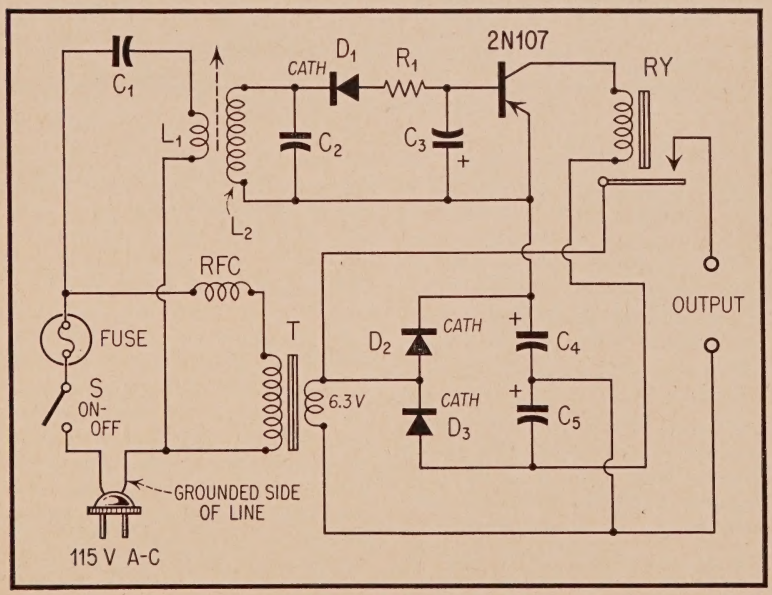


Fig. 4. Diode-Transistor-Type Wired-Radio Receiver.

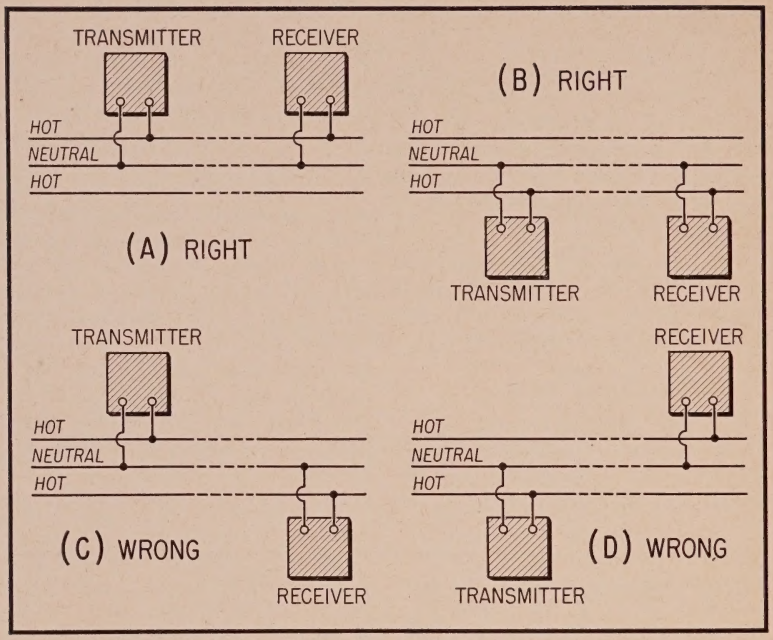


Fig. 5. Connections To 3-Wire Service.

of lower shunting capacitance), the number of appliances in operation in other buildings along the route, and whether separate distribution transformers are encountered. (It is seldom possible to transmit a useful amount of signal through a transformer when using low-powered amateur equipment.)

When three-wire service is used, both transmitter and receiver must be connected to the same side of the service. Figure 5 shows the right and wrong ways of making these connections.

Wired-radio transmitters and receivers should be adequately fused. When working with this equipment, the operator should take care to protect himself from line-voltage shocks and should build his equipment carefully to prevent accidental short circuits which could cause a fire as well as blowing the service fuses.

Before placing any type of carrier-current equipment into use, the operator should check with his local power company to ascertain if his intended frequency is being used already by the company in its operations. Some power companies employ carrier-current switching devices, and amateur transmitters could cause interference to these services. When this is determined, the amateur transmitter should be tuned far enough out of the range

of such commercially-used frequencies to prevent interference.

Reference

1. **Carrier-Controlled Switching.** Warner Clements. RADIO & TELEVISION NEWS, February 1955, p. 68.

PARTS LIST FOR FIGURE 1

C_1—0.1 ufd 600 v tubular — (C-D PM 6P1)

C_2—0.0051 ufd 500 wvdc mica — (C-D 1A5D51)

C_3—100 uufd mica — (C-D 5W5T1)

C_4-C_5—Dual 2-ufd 250 dcwv electrolytic — (C-D BBRD 2225)

L_1—5 turns insulated hookup wire closewound around L_2

L_2—0.5-5-mh tunable inductor (tapped) — Miller 6323

L_3—8 hy 100 ma filter choke — Merit C-2995

R_1—10,000 ohms 2 watts

RECT—75-ma selenium rectifier

RFC—Line filter choke: 0.6 mh, 2 amps — Miller 7825

S_1—Spst, normally-open pushbutton switch

S_2—Spst toggle switch

T—Midget power transformer: 120 v, 50 ma; 6.3 v, 2 A — Merit P-3045

PARTS LIST FOR FIGURE 2

C_1—0.005 ufd 500 v mica — (C-D 1W5D5)

C_2—150 uufd mica — (C-D 5W5T15)

C_3—50 ufd 250 dcwv electrolytic — (C-D BR 5025)

L—0.5-5-mh tunable inductor (tapped) — Miller 6323

R_1—10,000 ohms 2 watts

R_2—120 ohms 1 watt

R_3—33 ohms 1 watt

R_4—400 ohms 20 watts wirewound (Ohmite Brown Devil)

RECT—75-ma selenium rectifier

RFC_1, RFC_2—2½ mh, 200 ma r-f chokes — Miller 5222

S_1—Spst, normally-open pushbutton switch

S_2—Spst toggle switch

PARTS LIST FOR FIGURE 3

C_1—0.005 ufd silvered mica — (C-D 1DR5D5)

C_2—0.002 ufd silvered mica — (C-D 1R5D2)

C_3—0.01 ufd mica — (C-D 1D3S1)

D—High-current germanium diode — Hughes HD2150

L—1.5-10-mh tunable inductor — Miller 6322

RY—50-microampere, magnetic hold-in, meter-type d-c relay — Weston Sensitrol or equivalent

S—Spst toggle switch

PARTS LIST FOR FIGURE 4

C_1—0.1 ufd 600 v tubular — (C-D PM 6P1)

C_2—0.002 ufd silvered mica — (C-D 1R5D2)

C_3—1 ufd 6 dcwv subminiature electrolytic — (C-D NL 1-6)

C_4, C_5—50 ufd 25 v tubular electrolytics — (C-D BBR 50-25)

D_1, D_2, D_3—1N34 germanium diodes

L_1—10 turns No. 20 d. c. c. wire closewound around outside of L_2

L_2—1.5-10-mh tunable inductor — Miller 6322

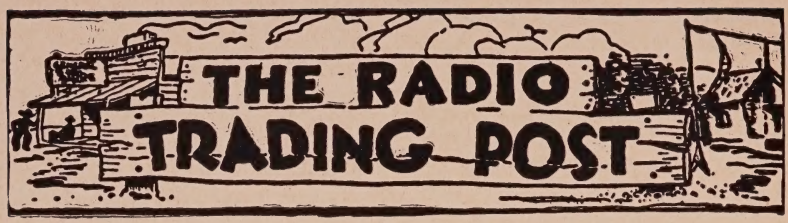
R_1—1000 ohms ½ watt

RFC—2½ mh, 200 ma r-f choke — Miller 5222

RY—2-ma, 8000-ohm d-c relay — Sigma 4-F

S—Spst toggle switch

T—6.3-volt 1-ampere filament transformer — Merit P-3074



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FOR SALE — All factory wired Eico excellent cond. with instruction manuals: 315 sig. gen., $25; 360 sweep gen., $25; 145 multi-sig. tracer, $15. Charles Bradley, 4157 S. Western Blvd., Chicago 9, Ill.

FOR SALE — Simpson 383 in-circuit capacitor leakage tester, $45; Transvision 6-in-1 component tester, $35. Both COD. Robert E. Redd, Box 12, Union Furnace, Ohio.

FOR SALE — Eico 536 multimeter, in excellent cond., precision 1% resistors, test leads, battery, manual, $10. Gerald Lemond, 8038 Eastern Ave., Bell Gardens, Calif.

FOR SALE — GE YGS-3 AM-FM sig. gen.; Hickok 610A TV alignment gen., 505A 5" scope, 156 indicating trace meter, 533 tube tester; Simpson 260 VOMA, A-1 cond., $450 plus shipping. Charlie Fisher, R 2, Box 747, Salisbury 4, N. C.

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WANTED — Tel-Rad secondary freq. std. 1000-100-10 kc output, or equivalent; data on test scope ID93/APG13A. State cond. and best price. Jule Fantaski, 160 Irwin St., Verona, Pa.

FOR SALE — Heathkit: AG-9, TC-2, LP-2, SG-8, C-3, for $90 or individual offers; DX-100 xmitter, $150; Viking mobile xmitter, $50; S40 B & Q multiplier, $50; Presto K-10 disc recorder, $150. J. G. David, Box 205, Bishopville, S. C.

TRADE — L. n. Alliance Tenna Rotor for FM tuner in good cond. or cash. Erik Avis, 7335 Cartwright Ave., Sun Valley, Calif.

FOR SALE — Unused 78B sig. gen. modified for 2-way service, 2 bands 27.5 Mc to 50 Mc and 148 Mc to 175 Mc, output from .1 to 10,000 microvolts. Write for details. L. Brown, 2115 Melbourne, Dallas 24, Texas.

FOR SALE — University 6201 coax speaker, l. n., $37.50; Carter genemotor 6 v. input, 400 VDC 200 ma out. cont., $75; Sonar SRT-120P xmitter, with power supply, fully TVI'd, $150. A. E. Clark, Jr., 44 Lewis Lane, Syosset, N. Y.

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FOR SALE — Two meter Gonset communicator 2 including 3 element Telerex beam and carbon mike, $150, A-1 cond. K. M. Wiegandt, 4 Parkway Court Circle, Allentown, Pa.

FOR SALE — NC300; Viking Ranger; MB-26 two meter xmitter; Meissner analyst; 7" Motorola TV; MR-3 3-band rcvr.; Supreme 680 audio osc; Riders Radio manuals. A. Turturro, 146-26 No. Hempstead Tpke., Flushing 55, N. Y.

FOR SALE — Two unused 0-1 M.A. 4½" square bakelite meters, knife-edge pointer, VOM scale, internal resistance 50 ohms. Ship postpaid $5 each. L. Cohen, 151-09-34th Ave., Flushing 54, N. Y.

FOR SALE — Fisher 80T FM-AM tuner and professional audio control in matching blonde cabinet, used for demonstration only, $150 complete. C. T. Martowicz, 117 East 7 St., New York, N. Y.

DONATION WANTED — The Children's Village at Dobbs Ferry, N. Y., a nonsectarian treatment center for emotionally disturbed children, has need for amateur gear, radio parts and test equip. for their radio program. Contact Murray R. Hersh, The Children's Village, Dobbs Ferry-on-Hudson, N. Y.

SELL OR TRADE — Fairchild 209 arm with xtal; GE UHF 103 converter; RCA type 1-L Master tenna amplifier; Blonder-Tongue DA2-1-M distribution amplifier; Shure 510S mike; Webster 156 changer; Pickering S-120M cartridge, l. n. J. A. Risse, 523 Harrison Ave., Scranton, Pa.

FOR SALE — FADA 795 self-powered FM tuner, 5 tubes plus rectifier, $12 postpaid. J. Salvatore, Control Systems Laboratory, University of Illinois, Urbana, Ill.

WANTED — 6 and 12 v power supply, meters, 117 VAC in, 6 and 12 v. out at 10 to 20 amps for car radio service; sig. gen. and small compact xmitter with power supply built in. Test equip. to swap also cash. John Arnold, Wilson St., Bluffs 3, Ill.

SELL OR TRADE — Am. Beauty 230 v soldering iron, $2.50; hand mimeograph machine, $25; assorted 2, 3, and 4,-gang condensers. Andrews, 740 Maple, Bethlehem, Pa.

WANTED — Model 12 RTTY also RTA-1 trans rcvr. Swap ham or photo gear. Leo T. Meister, 321 River Rd., Nutley 10, N. J.

WANTED — 3" or larger telescope Achromatic also books on telescopes. Have test and tubes, Hi-Fi gear plus cash. Theodore Nadeje, 5101-AA 39th Ave., Sunnyside 4, N. Y.

SELL OR TRADE — Complete set of ARC-5 schematics of 80-40 meter rcvrs. and xmiters, 50c. Also have BC645, R28/ARC-5, and Eldico 2-meter xmitter. S. Consalvo, 4905 Roanne Dr., Wash. 21, D. C.

FOR SALE — Precision E-200, $65, E-400, $85, EV-10S VTVM with RF probe, $70, Simpson 260 with case leather, $35, 269 with leads, $65, Hickok xtal gen 288 twin meters, $125. J. Pellock, 715 N. 7th, Benld, Ill.

SELL OR TRADE — Radio Electronics and Radio Service 1953 to 1957; Sams P.F. Reporter, 1956 and 1957. Best offer. G. H. Swiska, 109 E. School St., Woonsocket, R. I.

SELL OR TRADE — Superior 770-A VOM; Ciroflex E reflex camera; 2¼ x 3¼ film pack adapter. All l. n. Need good PA system or 20 to 35 w amplifier. Bill Hagara, Box 305, Slickville, Pa.

FOR SALE — "Fundamentals of vacuum tubes" by Eastman, 3rd Ed., l. n., $5. L. Matushefske, 2 Elmont Rd., Elmont L. I., N. Y.

FOR SALE — Heath VTVM and sig. tracer; multimeter; 5-amp rectifier tube; 300 w slide projector; 12" speaker; books and other electronic equip. Stanley Bombka, R 3, Eagle River, Wis.

FOR SALE — Heath 0-6 wired oscilloscope; Northeastern 700A sig. gen. Star Radio, 18456 Gable, Detroit 34, Mich.

FOR SALE — Prospectors or civil defense: sciltilator, 1½ x 1 xtal, 6 ranges, $165; 3-way geiger counter, bismuth tube, $65(geiger counter, halogen tube, $11.50. All perfect, nationally advertised brands. Stanley Hall, 1004 No. Lincoln, Burbank, Calif.

FOR SALE — Antiques: Clapp-Eastham spark coil (1910); beautiful large filter — wood and plate const.; West. Precision watt meter; variety of manuals. G. Oberlander, 215 Ridge, Ironwood, Mich.

BARGAIN — Sylvania 302 polymeter, 7" illuminated meter, 42 ranges including DC current, RF probe flat to 300 Mc., accessory 30 kv h. v. probe, never used, instructions and guarantee, $80 FOB. J. Kolocotronis, 751 Syracuse Ave., St. Louis 5, Mo.

FOR SALE — Precision instruments, automatic telephone equip., jack panels and associated patching equipment, relays, stamps-US plate blocks. Send for list specifying interest. Emil Backstrom, Jr., 5235 North Winhtrop Ave., Chicago 40, Ill.

WANTED — Outdoor speakers, FM rcvr. 152-162; walkie-talkies; mike; receiving tubes; 6 v to 110 AC inverter; used sound equip.; AM-FM tuner. S. Krzak, 65 Main St., Pawtucket, R. I.

SWAP — Unused custom quality Intercomm System complete with Operation and Service manual for good quality 35 mm camera and accessories. L. Buddine, 1700 W. High St., Haddon Heights, N. J.

WANTED — Olson radio, Akron, Ohio, pointers; pre-recorded stereo 2-track tape. Cash or trade electronic equip. Electronic Service Co., 1227 Windsor Ave., Richmond 27, Va.

FOR SALE — Heathkit SG-8 and GD-1A, 6 coils. Both perfect, $16 each. Instruction manuals with both. Prices plus shipping. J. D. Grigas, 258 Coe Rd., Clarendon Hills, Ill.

SELL OR TRADE — Christy 4 vol. Appliance Repair course, $7 or trade for? Harold Madden, Box 143, Kiowa, Okla.

FOR SALE — 1946 Motorola auto radio, $15; transformer swing and smooth choke for 350 v. 200 ma power supply, $20; variac, $15. All good cond., FOB. D. K. Lovett, 3629 Northwood Dr., Warren, Ohio.

FOR SALE — Latest Webcor 3-speed changer with new type GE cartridge and mahogany base, $36; University 6201 coax speaker in bass reflex enclosure, $59. Need portable Heath or Eico tube checker. John P. McMullen, 3050 Bainbridge Ave., Bronx 67, N. Y.

FOR SALE — 7" portable TV Tele-Tone TV-220 in operating cond., looks good. Best offer. George May, 2803 W. Chicago Dr., Nederland, Tex.

WANTED — CRV-ATJ TV camera; good cond., for Hallicrafters SX-42 rcvr. in good cond. Robert Britt, 876 Lincoln Ave., Evansville, Ind.

SELL OR SWAP — Image Orthicon tube RCA 5820 with manual — not broadcast quality but satisfactory for amateur use. Want mobile equip. Dave Fornshil, 2801 John St., Fort Wayne, Ind.

TRADE — Rider's 1950 FM Transmission and Reception, l. n. Need 1% resistors for VTVM. William J. McKay, 198 Fairfield Ave., Kenmore 23, N. Y.

WANTED — CRV-AJV TV camera; good Hi-Fi spkr system; Hi-Fi tape recorder; Hallicrafter SX88 rcvr. Want only items untampered with and in good cond. Bob Schill, Box 412, Hinsdale, N. H.

SELL OR TRADE — Heathkit FM-3, Electro-Voice Georgian enclosure. Best offer, or trade for stereo tape deck. Jack Corsiglia, 26 Rowley St., Rochester 7, N. Y.

SELL OR SWAP — BC221AK freq. meter, l. n. with factory tags and cal. xtal, no book. Need impedance bridge. J. A. Lazzeri, 300 North 8 St., Brooklyn 11, N. Y.

FOR SALE — Heathkit TC-2, l. n., $20; Senco LC-2 leakage checker, factory wired, $18. Both with instruction manuals. Gerald H. Rickert, North Hoosac Rd., Williamstown, Mass.

FOR SALE — Monimatch SWR bridge, wired complete with cabinet and meter, $14 postpaid. R. E. Neal, 1003 Glenwood, Manchester, Tenn.

JOB WANTED — As ship radio operator. Have second class Radiotelegraph and Radiotelephone Licenses. W. Chisholm, 261 Southwest 12 St., Miami 36, Fla.

WANTED — Will pay $20 for used Simpson 260 VOM or equivalent in reasonable cond. Latham Radio & TV, Cuba City, Wis.

WANTED — Operators manual for RCA 158 scope. State price. John Puttress, 6310 Winthrop, Detroit 28, Mich.

SELL OR TRADE — TV booster, $8; Wilcox portable disc-radio recorder, $35; combination 35 mm projector and PA amplifier, $40. Want Elmac AF-67, A-54, mobile xmitter, 20 mtr beam. A. Haberman, 129 Morgan St., Holyoke, Mass.

WANTED — 12 v and/or 110 v AC power supply for BC-669 transceiver; 110 v AC short wave rcvr.; depth indicator or Fathometer for boat. Have cash or photo or electronic equip. W. Hansen, 165 Silverbrook Ave., Niles, Mich.

WANTED — Radio & TV test equip. State model, cond., and details. Donald Heim, 2450 Pearl St., Dubuque, Iowa.

FOR SALE — 15" GE color set, operating, $125; 12" TV, $12; 16" TV, $16. Will ship. Want RCA WV65A battery voltohmist. Ced Justis, Newport, Del.

TRADE — Webcor tape recorder, clean and little used. Want good communications rcvr. or hi-fi equip. Walt Bartell, 5536 Wilson Ave., Chicago 30, Ill.

SELL OR TRADE — Several hundred DeVry TV study books, various classifications, all l. n. Dick Blackmer, 2029 Bradley, Chicago 18, Ill.

FOR SALE — RCA test meter CX-7A1, for 2-way radio. Best offer. Connecticut Electronics, 759 Boston Post Road, Milford, Conn.

WANTED — Lionel O gauge steam turbine no. 681. Will trade home study course "Motion Picture Camerman" N. Y. Institute of Photography. Frederick R. Shutt, 612 Frantz Ave., Mullens, W. Va.

SELL OR TRADE — Turner 33D mike, $5; BC-459A xmitter converted for CW, $10; BC 375 manual, 75c; 50 watt homebrew modulator. H. F. Berkshire, Lanark, Ill.

WANTED — Good 500 w. 35 mm slide projector; tape recorder; 45 cal. automatic. Have TV & radio tubes, top brands in original boxes to trade. Local only. H. Bernard, 6321 SW 80 St., Miami, 43, Fla.

FOR SALE — Surplus gov't and commercial communications equip., parts, transmitters, rcvrs., power supplies, cables, all good, some used, 10c per pound FOB. Gowin Enterprises, Box 439, Fairbanks, Alaska.

SELL — Used WRL SM-90 screen modulator, $10. Dick Lindner, 423 Columbus Ave., Brillion, Wis.

SELL OR TRADE — Norelco TV projection tube and speaker. Need 5" scope, Sams, and tubes. George Sciullo, 2026 Ridge Ave, Arnold, Pa.

FOR SALE — Revere T700D tape recorder, excellent cond., telephone pickup, audio tape demagnetizer, Carson tape splicer, other accessories, $125. Prefer local. Murry Liebowitz, 360 95th St., Brooklyn 9, N. Y.

FOR SALE — FM rcvrs., hi and lo band. Best prices. Free list. George Kee, 219 Harmony St., New Castle, Del.

TRADE — Electronic game/computer same as in Popular Electronics Sept. 57, all new parts. Mounted pegboard panel. Want 10-17" TV or table saw. G. E. Stowers, 2020 East 48 Ter., Kansas City, Mo.

FOR SALE — Make offer on: BC788 transceivers less tubes and xtal; BC-A0-230 xmitters complete plus shock mount; BC442A antenna relay units with 10 amp RF meter; dummy antenna A61A with 4 amp RF meter. Ed Block, Grandview, Tex.

SELL OR TRADE — Victor 40 sound projector 16 mm, l. n., for good 40 or 50 h.p. outboard motor. Ellisons Radio Service & TV, 211 West Main St., Sedalia, Mo.

SWAP — Triplett 666 HH milliammeter for 8 mm movie film. Oswald Maillett, 5 Emerald St., Gardner, Mass.

FOR SALE — Xmitters: AT-1, Millen exciter and Meissner VFO adapted for plate modulation; Heathkit battery "B" eliminator. C. Derapelian, 945 E. 180 St., New York 60, N. Y.

SELL OR TRADE — CIRE complete master course, 3 lessons completed, books, slide rule, $110, or trade for ham or communication rcvr. or ham mobile equip. Lawrence Loughran, 754 21st Ave., San Francisco, Calif.

FOR SALE — Jackson 648 tube tester, excellent cond., $45 plus postage, insurance. Echement TV Ser., 2434 Raymont Dr., Clearwater, Fla.

FOR SALE — Hickok 505 oscilloscope, excellent cond., $75. H. E. Hopper, 26 Oak Ridge Rd., Ramsey, N. J.

WANTED — Used correspondence course, Grantham School of Electronics, complete training for first class FCC commercial operator license. Derek Fairbourne, 428 S. Prospect Ave., Bergenfield, N. J.

FOR SALE — Fairchild 281 transcription arm with cartridge slides and GE included, plus spare parts, $20; FM specialties tuner, not a kit, $20. Local only. F. Rasmussen, 454 E. 180th St., New York 57, N. Y.

WANT — Bound Vol. 1, GE Ham News; all types of socket punches. Have radio magazines to trade. R. Farmer, 3113 No. Columbia, Plainview, Tex.

WANTED — To correspond with someone having a P.R. 15 communication rcvr. George Connor, 101 N. Broadway, White Plains, N. Y.

SWAP — 8 mm projector with sound, 1. n., for Viking II or equivalent, or better xmitter equip. Fred Madlinger, 478 Woodward Ave., Brooklyn 37, N. Y.

FOR SALE — Well established Radio-TV service. Franchised dealer for Admiral, Philco, and V-M. Excellent reputation. Can show proof of income. Lee's TV Sales, Box 125, Porter, Ind.

SELL OR TRADE — MD7 modulator; BC348J converted AC; Telrad 18A; RME DB22 preselector; Webster bandspanner ant.; Johnson filter; DM35 dynamotor; Revere tape recorder; Elmac PMR6A rcvr. Want Radio-TV test equip. L. H. Carver, 2759 Rainbow Rd., Jacksonville, Fla.

FOR SALE — E-200-C deluxe signal marker gen., $70; E-400 deluxe sweep gen., $130. Good bargain. Oscar Miranda, 3004 W. Cass St., Tampa 9, Fla.

FOR SALE — 5 UHF converters, $5 each; 12Z3 and 5V4 tubes; 10 807 tubes, 15c each. Sootin's, 321 N.W. 3rd Ave., Miami 36, Fla.

WANTED — Miller R-9'er preselector and coils for 40, 20, 15, and 10 meter bands. Will buy or trade 304T Eimac tube. W. E. Carson, Reactor Design Section, Box 1260, 1201 Kemper St., Lynchburg, Va.

FOR SALE — D-79 Gaussmeter, serial no. 616, complete with probes, cable, calibrating magnet, carrying case, and instruction book. Sell for $275 cash, prepaid. Guaranteed mint condition. Lampkin Labs., Inc., Bradenton, Fla.

WANTED — RCA Victor bound service vols. II (1938-1942) and III (1943-1946). State cond. and price. John Dyr, 183 Malcolm Ave., Garfield, N. J.

FOR SALE — Hickok 680 TV RF marker crystal controlled calibrators, sacrifice for $50 each; model 690 VHF-UHF calibrator, $100. TV Labs, 111 Main St., Waterville, N. Y.

WANTED — URA-8A, FGC-1, and Northern Radio teletype receiving converters; all types teletype machines, equip., and converters. Tom Howard, Box 19, Boston 1, Mass.

SELL OR TRADE — "Dictaphone" model 12, $15 or trade for VOM meter; sig. gen., scope, typewriter, Sam's Photofacts. W. B. Jones, Carnesville, Ga.

FOR SALE — All Eico, in perfect cond: 625 tube tester; sig. gen., VTVM, 1050 6 v and 12 v battery eliminator, sig. tracer; Sprague KT-1 capacitor checker, $100 plus R.R. express. A. J. Comeau, 45 River St., Southbridge, Mass.

FOR SALE — 56 back issues of Audio Engineering, June 1949 to July 1954. Irving Levin, 62-34 99th St., Rego Park 74, N. Y.

SWAP — Simplex theater sound preamp and PA, model AM-141, AM-142, P-P 1622's. Want small scope, kit or assembled. Preston Taylor, Box 312, Bonner Springs, Kan.

WANTED — Sams Photofacts in envelopes or binders; also unused special controls or capacitors if overstocked, in original cartons. Send list and lowest cash price. D. Green, Box 685, Hamilton, Ohio

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FOR SALE — Several early bound volumes of Sam's Photofacts. James W. Jackson, 4704 N.E. 89th Ave., Portland 20, Ore.

FOR SALE — Unused Millen grid dip meter, $48. B. C. Droke, Box 887, Eau Gallie, Fla.

FOR SALE — Heath kits: Audio freq. meter, $19.95; audio gen., $13.95; battery eliminator 6-12 v., $17.50; power supply PS-2, $16; Radio City 7 30 AM-AF-FM sig. gen., $13.75. Archie Travis, 259 Grove St., Bangor, Maine.

SELL OR SWAP — DeForest's training course, $25 postpaid, no kits; never used 10" Zenith speaker; Field 450 ohms and output trans., $5. Want DX 40 or DX 100 xmitter. Harold Kunkee, 3330 No. 53, Lincoln 4, Neb.

FOR SALE — BC 348 P communication rcvr. in excellent cond., $50. Prefer local. Alfred L. Isaacson, 3610 Sunnyside Ave., Chicago 25, Ill.

FOR SALE — Build an electronic organ. Basic units 60-note triple stacked shunt keying mechanisms, 12 tone generator sub-assemblies C through B; 5 octaves, 60 notes. Service manual, diagrams, pictures, $25 FOB. Jack Wilhelm, 1008 Willowbrook Dr., Greensboro, N. C.

WANTED — Hallicrafters SX-25, SX-28A, Hammarlund HQ-129X. Cash or swap, Pilot FA-540 tuner, Meissner 9-1040 analyst. C. Wegrzynowski, 51 North Central St., Buffalo 12, N. Y.

WANTED — Old radios, TV and phonographs, any cond., to donate to orphanages, shut-ins, etc. Send description and price. C. Baker, 8 Valley View Rd., Newtown Square, Pa.

FOR SALE — National MB-150 multi-band tank assembly, 1. n. Best offer over $12. A. C. Hulsizer, 21 Baker St., Poughkeepsie, N. Y.

SELL OR TRADE — Hallicrafters S20R rcvr. with manual; Heathkit Q-multiplier with instructions. Want tape recorder, any type in operating cond. H. Schachter, 51 E. 89th St., Brooklyn 36, N. Y.

SELL OR TRADE — Audio osc., Hewlet Packard 200-C, 200-D, 205AG; General Radio VTVM 726; sig. gen TS497; I-208 FM sig. gen.; National 1-10 rcvr. Want Millen or Measurements grid dip meter. William C. Pendergast, 9777 E. Hasket Lane, Dayton 4, Ohio.

SWAP — Zenith 21K20 TV flyback transformer; SNC output transformer 20 watts; pair 6L6's or 6V6's; Weston milliampere DC 0-300. All for 6 gov't surplus 6L6's, and one 815. Frank Bou, 47 Oswego Ave., Audubon 6, N. J.

FOR SALE — Test equip., FOB Butler: Precision E400 sweep gen., $79; Sylvania VTVM with RF probe, $50; Sprague Kwik-Test KT-1, $10. All in good cond. James H. Skillman, 115 E. North St., Butler, Pa.

FOR SALE — RCA Pict-O-Guide, vol. III, 1. n., $1.50; RCA 6SB7-Y, $1.50 and 6SG7, $1.25 (both tubes $2.50). All items postpaid in U.S.A. John A. Fels, 801 Silver Spring Ave., Silver Spring, Md.

SELL OR TRADE — Factory wired Viking Ranger, $175 or will trade mobile converter or small xmitter. Lawrence Lewis, Aberdeen, Idaho.

FOR SALE — Perfect high power mobile dynamotor 12-1000 volts, 350 mill, $35; Hickok 156 traceometer, 1. n., $65; PE103 dynamotor, 12 v., $15; tri band beam, 60' tower, cheap. Larry Larison, 530 Elsur, Duarte, Calif.

FOR SALE — Heath: TC-2P tube checker with TV picture tube adapter and acorn socket, $45; 0-11 scope, $75; voltage calibrator VC-3, $14; Philco 7050 tube checker, needs modernizing, $25. Michael Bilgrei, 146 Hewes St., Brooklyn, N. Y.

FOR SALE — Heath C-3 condenser checker, $19.45 and T-3 sig. tracer, $23.50. Bob Hartman, Dakota, Ill.

FOR SALE — Alliance U-98 rotor and control; single 813 Pi-net work 500 w. transmitter, 10 thru 80 meters; Midwest 6-band all-wave 16 tube short wave radio and speaker; GE K-85 8 tube all-wave radio and speaker. W. E. Jones, Box 4, Bowmansville, N. Y.

FOR SALE — Eico 360 sweep gen., $19.50; TV booster, $5. Will ship. R. W. Dorn, 3303 Lambert Ave. N.W., Canton 8, Ohio.

FOR SALE — Harman Kardon PC-200 Hi-Fi amplifier, 12 w., 1. n. Best offer. Jack Fives, 2916 Rockrose Ave., Baltimore 15, Md.

FOR SALE — V-M 974 phonograph, automatic, 3-speed, new cartridge, $35. Matt Beha, Jr., Box 373, O'Neill, Neb.

FOR SALE — Like new NC-300, xtal calib. spkr, 2 and 6 meter converters. Metropolitan area only, $350. J. Munk, 220 Boscobel Pl., Bronx 52, N. Y.

SELL OR TRADE — 15-600 KC RAZ rcvr. with preselector and 110 AC 60 v. power supply, $30; SCR-522, $25; 6 v. 7A power supply, $10. Want small scope or 16 mm movie camera. R. Carlsen, 485 Woodbine St., Uniondale, L. I., N. Y.

WANTED — For cash: Motorola cabinet to fit 7JP4 and TS18 chassis or 8BP4 pix tube. State lowest price. Joseph Domurat, 205 E. Cottage St., Dorchester 25, Mass.

WANTED — Will pay 10 cents copy CQ July 56, QST April 55 to date, or trade Riders Record Changer manual and Deforest Radio Course. D. C. Harrington, 2508-B 36th St., Los Alamos, N. Mex.

WANTED — RME DB-23 preselector. Howard Glaze, 4557 Crestshire Lane, St. Ann, Mo.

FOR SALE — Heathkit TS-3 sweep and marker gen., l. n., with manual, $42.50. Tubes to trade, of older loctal, octal, and other types. Leo's Radio, Frenchtown, Mont.

WANTED — Aircraft radio equip. for light plane VHF, Omni, etc., also 2 meter commercial equip. Jack Gutzeit, 75-02-168 St., Flushing 66, N. Y.

SWAP — BC-654 transceiver; IRE Proceedings 1947-'56; model engines: Fox 29, McCoy 49, others l. n. Need Universal SW-3 rcvr., SP-44 panadapter,, HO gauge trains. E. V. Blaize, Jr., 2324 Mexico, New Orleans, La.

SELL OR TRADE — Collectors Items: Browning and Drake battery set; 10D WE horn speaker; 2-1-tube tuners; Apex elec-set with Utah speaker. W. Fischer, 67 Marked Tree Rd., Needham, Mass.

SELL OR SWAP — Foot's induction phones no wire from phones to rcvr., featured in "Popular Electronic's Carl and Jerry" column. Need scope with 5 mc response. Mel Garfinkel, 3312 Hull Ave., Bronx 67, N. Y.

FOR SALE — Unused, perfect transister kit. Will build ten circuits or more. Complete instructions, $15, send 50%, will ship C.O.D. Bob Rupley, Box 348, Pleasantville, N. J.

SWAP — One or all 3 perfect undated National Geographic binders, for new QST binders. Have old electric books, my list for yours. Wesley W. Brogan, 306 Bethlehem Pike, Ambler, Pa.

TRADE — 14 South American chinchillas and equip. for test equip. sweep and marker gen. wide band scope, other test or Hi-Fi equip. Prefer RCA or Hickok test equip. Thomas Alexander, Lacona, N. Y.

FOR SALE — Eico 320 sig. gen., $15; 360 sweep gen., $30; 147 sig. tracer, $17.50; 950B RCL bridge, $15; Precise 300B 7" scope, $85. Ship prepaid on receipt of money order. Charles Jones, Box 572, Springfield, Ore.

FOR SALE — Solar cafi exameter; Vomax VTVM; Timex recorder; 660 all-wave gen.; tube tester, atomic geiger counter with probe; Ferrett substitution tester, A-B eliminator. Roberts, Box 384, Oxnard, Calif.

FOR SALE — Paco oscilloscope, push-pull, $38, l. n. Arthur M. Spatz, 808 59th St., Brooklyn 20, N. Y.

TRADE — L. n. 75 watt inverter, output 110 v from 6 v battery, for recent radio or TV course. Sell Voigtlander camera, 3.5 anastigmat lens, enlarger, 4.5 lens, double condenser, auto focus, exposure meter, etc., $150. Oscar Preston, R 2, Box 182, Wayne, W. Va.

HAM STEAL — DX20, perfect with high-quality tuning knobs, spare tubes, VFO, xtals, and modulator, only $40. Peter Levine, 3388 Wayne Ave., New York 67, N. Y.

FOR SALE — Scott 112 dynaural pre-amp noise suppressor, A-1 cond., $25; Weston 777 tube checker, $20; 7" 200 micro-amp meter VTVM scale, $10; Alliance BB2 casamatic TV booster, $7. All FOB in good cond. Frank Denning, 86 75 Midland Pky., Jamaica 32, N. Y.

FOR SALE — Riders vol. 1 to 15; Radiola III type R-1 antique, uses 2-UX-199; Heath vibrator tester; Eico signal tracer. Eino Hokkanaen, 188 Crescent St., Athol, Mass.

WANTED — FM xmitter and rcvr. for commercial use, 30-50 Mc., Motorola, G.E., or Link, in working cond. John Runyon, 1350 Brooklyn Blvd., Bayshore, N. Y.

SWAP — 50 w. phone-CW station, including xmitter, rcvr., mike, key., VOM, xtals, and Q-multiplier, for good binocular microscope or Leica camera and accessories. Jack Flanagan, 1249 Cambridge St., Cambridge, Mass.

FOR SALE — Triplett 630 VOM, l. n., $25; Channel Master 7-element traveling wave single bay TV antenna, used little, $27.50 or $50 for both. T. E. Larson, RFD, Alexandria, Ohio.

FOR SALE — Riders TV manuals 2 thru 9, $56; Hickok 600 tube checker, $65; Simpson 488 field strength checker, $50; Hickok 620 linearity, $50; Ebco picture tube checker, $12; RMS bar gen., $6. Roka, 5341 Cordelia Ave., Baltimore 15, Md.

WANTED — TV sweep gen., RCA, GE, or equal. Ernest Ferro, 612 Thomas Pl., Bound Brook, N. J.

SELL OR SWAP — Motorola 608 push-button auto radio, perf. cond. Best offer, or swap for typewriter in working cond. E. Hoover, 3505 Decatur Ave., Bronx 67, N. Y.

FOR SALE — BC-348 rcvr., excellent cond. and appearance. J. Chromy, 311 Village Rd., Wilmington 5, Del.

FOR SALE — GE tube tester, TC-3A; Fisher 50 w. ampl., pre-ampl., AM-FM tuner 80R and Electro Voice 15 spkr. system; wireless 78 Webcor phono. John Magnus, 9415 So. 55th Ave., Oak Lawn, Ill.

WANTED — B & W dip meter; D104 mike stand; antenna measuring and monitoring equip; other surplus gear. Harold MacDonald, Kodiak, Alaska.

WANTED — Combined oscillator BC and LW series condenser part No. 31-6024, also complete oscillator transformer part 32-1710 for Philco 640 or 650 radio, or complete discarded model 640. Joseph Spalla, Plaza, N. Dak.

TRADE — Remington rifle, for portable typewriter, tube checker, or TV set 17" or larger. Jimmy's Radio Service, Box 44, Parrott, Ga.

WANTED — RCA Pict-O-Guides, vols. 1 and 2, and new color Pict-O-Guide. Harp's Radio & TV Service, Box 217, Old Ocean, Tex.

WANTED — Catalogs and data on old Capehart radiograms especially 400 series. L. Marks, 14 Avenue Rd., Kingston, Surrey, England.

FOR SALE — Supreme 582 sig. gen. and frequency modulator complete with test leads and operating instructions, $7 plus $2 packing and express charges. Austin B. Wardman, 106 Rossmore St., East Pittsburgh, Pa.

SELL OR SWAP — Heath TS-4A sweep gen., FM-3A tuner, l. n., with all manuals and cables, for cash, AM modulation monitor, scope calibrator, audio gen., resistor-capacitor decades, 152-174 Mc rcvr. Emmet D. Cox, 2912 Madison Ave., Evansville 14, Indiana.

FOR SALE — Complete Phone-CW, 5-band xmitter, with VFO, antenna coupler, change-over relay, low pass filter, l. n., $50. Jim Kirk, 1601 Church, San Francisco 14, Calif.

WANTED — ARC-5 rcvr. and xmitter. (or similar) completely converted for 80 or 40 meter phone. State price for parts or complete outfit. John Davis, 6801 19 Ave., Brooklyn 4, N. Y.

TRADE — Precision E400 sweep gen. with xtals, cables, instructions, used once; transvision tester; Eico 352 bar gen.; 7JP4 CRT. Want tubes, Sams, Riders, radios. John Rosol, 28 Winans Ave., Newark 3, N. J.

WANTED — Eico or Heathkit TV scope. State price. Have radio magazines at discount — Radio Electronics, 3 years, $6. David Pollock, 178 Pinckney Rd., Little Silver, N. J.

FOR SALE — Technical manuals for SCR's: 300-A, 536-A, B, C, D, E, and F, also supplements for SCR-536, $1 each. Jack Soudriette, 2137 F St., NW, Washington 7, D. C.

FOR SALE — Geib amplifier-spkr. in case, $10; Webster 26 auto. 78 rpm changer, $8; Brush xtal. mike, $2. All perfect, FOB. James Nohe, 26 Vine St., Hillside, N. J.

SELL OR SWAP — Books: Servicing Superheterodynes and FM Transmission and Reception (Rider); (Uslan) TV Simplified (Kiver). Want tube tester, sig. gen., scope, or other books. Martin Feldman, 265 Cabrini Blvd., New York 40, N. Y.

TRADE — Sams Photofact sets; courses on radio, TV, and color TV test equip. old magazines for microscope, guitar, or ? William Barber, Box 381-A, Oak St. Ext., Lowellville, Ohio.

WANT — 16 mm movie camera in good shape. Have VTVM or tube tester; excellent 120 camera F.4.5, anastigmat lens with flash; tape recorder Telectro; Hi-Fi job in custom-built cabinet, 25 w. output with 3 speakers. Harold Wurm, 1015 W. Grant St., Appleton, Wis.

SELL OR TRADE — 2 meter SCR522, rack mtd. power supply, $35; rack mounted 6 meter phone xmitter, 25-30 w., $35. B. Weisberg, 2707 Creston Ave., Bronx 68, N. Y.

FOR SALE — Gen. Radio variac 0-135 v AC at 5 amps. Make offer. Want good make sig. gen. for cash. Give details. Walter W. Ellett, 21040 Bobb Rd., Cupertino, Calif.

SELL OR TRADE — German microscope, 50-2500 power, 5 ocular and 4 objective lenses for less than half price. Walter A. Tilleman, Bendix Depot, Hq. TAC Control Wing, APO 65, New York, N. Y.

FOR SALE — Homemade 13 tube amateur xmitter, to 100 watts, AM-CW; Heath FM-2 tuner, oscillator not functioning, $10. Peter Stark, 519 East 86 St., New York 28, N. Y.

SELL OR TRADE — Zenith transoceanic and 16 mm sound movies, for sweep and marker gen or audio test equip. Local only. George Galitsis, 22-31 26 St., Long Island City 5, N. Y.

FOR SALE — Heath AM-1 antenna impedence meter expertly assembled and wired, $11.75 postpaid; PE-103-A with power plug, spare brushes, and extra 6 v solenoid, $22.50 FOB. M. E. Lawson, 4010 River Dr., Houston 17, Tex.

FOR SALE — Hickok 533D-M dynamic mutual conductance tube checker slightly used, $100. Edelson Radio, 13 Graham Ave., Brooklyn 6, N. Y.

SELL OR SWAP — Unused 15GP22 color TV tube; 1850A Iconoscope and 5820 Orthicon. A. C. Denson, Box 122, Rockville, Conn.

FOR SALE — Steel full size excellent cond. office desk and chair, (list price $145) for $98.50; Checkwriter, for $29.50; 4-drawer filing cabinet, locking drawers, $19.50; unused telephone table, $21.50; Monroe MA-6 automatic calculator less than half price. Herbert Piller, 451 Thieriot Ave., Bronx 72, N. Y.

WANTED — Chrisy Appliance Repair Service course. Describe cond., price. Must be reasonable. C. Lombardo, 1685 Lafayette Ave., Bronx 72, N. Y.

FOR SALE — RCA AVT-15 aircraft xmitter surplus, $10; BC221-AH freq. meter, $50; T22/ARC-5 xmitter, R27/ARC5 rcvr. surplus, $10 each; RCA 158-5" scope, needs some work, $20. Ed Larabel, 344 Dickinson SW, Grand Rapids 7, Mich.

FOR SALE — Latest Eico 232K VTVM, $30; Weller soldering gun S500, heavy duty, $5; auto radios; Ford automatic tuning part No. 102-2-57, $15; push button 2233297, $10. All excellent. A. Stellerman, 229 Snediker Ave., Brooklyn 7, N. Y.

FOR SALE — Arm with GE cartridge, diamond LP stylus one month old, excellent tracking, $15; arm with astatic ceramic cartridge, sapphire .003 stylus, $5. Both perfect. Brad Lentz, 710 E. Virginia, Peoria, Ill.

SWAP — Like new 813, 4-65A, 4-125A, AX9903/5894A, 304-TL, 829B for ham mobile equip., commercially built. George Cohen, 328 Crest, Ann Arbor, Mich.

FOR SALE — Used Signal Corps gen. GN-54; photo switch liquid level control type 10BC4 l. n. Best offer. F. Veno, 713 Plainfield Ave., Joliet, Ill.

WANTED — Honey extractor, UHF converters, Hickok 770 scope, and 539B tube tester, tubes. Dennis T. Willis, 1404 So. Jackson St., Tucumcari, N. M.

FOR SALE — Philcophone 5-station intercom with 3 sub stations, good cond., $25. Doty Radio Service, 71 Rita St., Dayton 4, Ohio.

FOR SALE — RCA KRK 11 tuner less tubes, $10 or offer. A. F. Zansler, Jr., 8440 Jeff. Hwy., New Orleans 23, La.

FOR SALE — Viking Adventurer xmitter, with push-pull 6L6 modulator, $65 FOB. Local preferred. Frank Scaglione, 111 Stuyvesant Ave., Jersey City, N. J.

FOR SALE — Acme transistorized metal locators, $30 and $45; transistorized audio frequency meter, $25; Ford 1950 p.b. radio, $7. Want CBS Transistor course. J. Chang, 127 Great East Neck Rd., Babylon, N. Y.

WANTED — Tube tester, good or repairable, will pay shipping. Also for cash, 8 mm movie films. Send list and titles of films and price. Irving Segal, 528 N. Vista St., Los Angeles 36, Calif.

FOR SALE — TDC 35 mm strip film projector model A.S., $29.95; RMS bar-1 gen., $6.75; Heath S-2 electronic switch, $9.95; National Union videotron pix tube checker, $12.50; GE T44 time switch, $8.75. Archie Travis, 259 Grove St., Bangor, Maine.

FOR SALE — Unused 3-way TV-phono-radio, model 8. $60 local only. Paul Davis, 141-21-78 Rd., Flushing 67, N. Y.

WANTED — Schematic diagram of RCA U44 AM and shortwave radio. Andrew Gonzalez, 3809 So. Flower Dr., Los Angeles 37, Calif.

FOR SALE — Kay megasweep, $100; RCA xtal calibrator, $45; Heath LP1 modified to LP2, $20; 16" 630 chassis with turret tuners, $35; 15 TV chassis, no tubes, need repairs, $5 each. V. Iavarone, 1218 Leland Ave., Bronx 72, N. Y.

FOR SALE — BC-645 partially converted for 420 Mc as per QST; AN/CRC-7 VHF Handy Talkie on 121.5 Mc, less battery; Meissner deluxe signal shifter, each $10. F. Seaverns, 9190 Ogden St., Thornton, Colo.

FOR SALE — RCA Pictoguides vols. 1, 2, and 3. Make offer. Will ship postpaid. C. Zieg, 942-30th St., San Pedro, Calif.

FOR SALE — Anko TS-32 tube checker; Superior TV 11 tube checker; Feiler electronic stethoscope. All in A-1 cond. Make offer. Paul Wilcox, 151 Reisinger Ave., Dayton 7, Ohio.

SELL OR TRADE — Complete metal locator, unused, for Conelrad monitor, must meet F.C.C. requirements, or ? Meryle Hansen, Box 126, Ruthton, Minn.

SELL OR TRADE — Westinghouse 5 v. dynamotor (600 v. @ 260 Ma. output.) $12; 6 v. 20 amp fil. xformer, $9. Need 800 v. @ 480 Ma power xformer; 480 Ma filter choke (±10%). Phila area only! Gene Mick, 515 Buxmont St., Philadelphia 16, Pa.

FOR SALE — NRI Radio and TV course. Complete with experiments, less kits. Best offer. Winston Higgins, R 1, Grannis, Ark.

WANTED — Permanent or electro magnet of smallest possible size capable of having complete control of round iron object, 1 3/16" diameter at a distance of 3" or greater. Cash or have ham and radio gear. B. S. Rutkowski, 5030 Walsh Ave., East Chicago, Ind.

FOR SALE — Eico 221 VTVM, good working cond., factory wired, $20. Consider trade for Radio and TV correspondence course. Hyman Levine, 1083 E. 10 St., Brooklyn 32, N. Y.

FOR SALE — Hallicrafters S53-A rcvr. plus headphones, for highest offer over $40. Ronald Johansen, 446 E. 88 St., New York 28, N. Y.

WANTED — TV tuners for Motorola 21C1 part no. TT-45 and CBS Sky King-Sarkes-Tarzian part no. 59543A. Will sell Supreme 600 tube and set tester, $65. Albert Hart, 207 N. Raymond St., Griffith, Ind.

FOR SALE — 6 and 12 v. dynamotor, 1. n., $10; xtal head phone, $2; HV xmitter mica condenser, 50 cents, new cond.; telegraph key, $1.25; 80 or 10 meter amateur xtal, 75 cents. Travis Heard, 8915 Byron 13, Detroit 2, Mich.

FOR SALE — Heathkit AR3 communications rcvr. and QF1 multiplier factory aligned and tested. Excellent working cond. Best cash offer. D. Landesberg, 179 Marcy Ave., Brooklyn 11, N. Y.

FOR SALE — Hammurlund HQ129X rcvr. in perfect cond., FOB, $125. Morton Goldman, 1530 S.W. 22 Ter., Miami 45, Fla.

SELL OR SWAP — Viking I xmitter with mike, VFO relay; mobile 10 meter xmitter. Need rcvr., grid dipper, antenna scope, test equip. Dave Siegel, 130-18 223 St., Laurelton 13, N. Y.

FOR SALE — Ten years "Service" magazine 1948 to 1958, $10 prepaid, or $1 per year. No single copy sales. Toll House, West Cornwall, Conn.

WANTED FOR CASH — Good tape recorder in working cond., 7½" per second preferred for $60 to $70 cash plus partial TV set, used TV parts, etc. Ira Glickstein, 21 Brighton 5th Lane, Brooklyn 35, N. Y.

SELL OR TRADE — Spencer Laboratory black and chrome microscope, for communications rcvr., or for $175. William Wozniak, 3207 Brooks Pl., Gary, Ind.

FOR SALE — Ampro 730 tape recorder, $45; Emerson 12" TV, $20; Admiral 10" TV, no cabinet, $10; all FOB. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — Hickok 610A sweep sig. gen., used very little, $75 Precision series 912 tube tester, $35; postcard Printomatic printer, $12.50. Bohac Radio-TV, 7409½ Beverly Blvd., Los Angeles 36, Calif.

SELL OR SWAP — AC and DC meters, motors, tools. Want electron test equip. A. Keidanz, 1351 Boynton Ave., Bronx 72, N. Y.

WANTED — Riders Servicing by Signal Tracing. Warren W. Manke, Box 1171, Mansfield, Wash.

SELL OR SWAP — ICS TV and FM servicing course with instruction books, bound in loose-leaf notebooks, $25, or swap for communications rcvr. Have Regency TV booster, $5; power supply 800 v pr 866A 300 Ma, $10. W. S. Ernest, 79 Airy Ave., Lansdale M.R., Pa.

FOR SALE — Zenith transoceanic about 12 years old telescoping antenna works perfect less batteries, $25; 5BR2 Morrow conv. used 5 hours, $50; all components for a 2000 to 3200 v. PS, $25. Plus postage on all. George Colacicco, Rt. 3, Box 400-D, White Rd., San Jose, Calif.

FOR SALE — RCA 8T241 chassis converted to 21" operation with all tubes and new ram 70% yoke, hi-volt transf, also Sams Photofacts for above, $10. Unused 21" FPH CRT, $10. Local only. Antonio LoBianco, 2861 Exterior St., Bronx 63, N. Y.

FOR SALE — Viking I, TVI'd low pass filter complete with tubes and xtals, and Johnson VFO. All in excellent cond., $125. Lawrence Romard, 49 Villa Pl., Eatontown, N. J.

WANTED — Mon-Key with instruction book in good cond. Must be reasonable. C. L. Stouth, Box 44, King of Prussia, Pa.

SWAP — Custom intercomm system for power tools, 35 mm camera, transistor portable radio or hi-fi equip. L. Buddine, 1700 W. High St., Haddon Heights, N. J.

SELL OR SWAP — Wire Way WP wire recorder, amplifier, phonograph in portable leather case with spool of wire. Excellent cond., $30. LeRoy Singer, 4 Atwood Rd., Plainview, N. Y.

FOR SALE — Zenith automatic 4-speed phono and radio cobramatic model, perfect cond., $35. P. J. Calderaro, 594 Main St., Wakefield, Mass.

WANTED — Good clean Super Pro rcvr. and guaranteed 417A tubes. State lowest price. A. G. Facans, 158 Jefferson Ave., Rahway, N. J.

FOR SALE — B and W condenser CX62C with 2 neutralizing condensers, $10; Thordarson power transformer 545-545 150 V.A., $7. Fred Norton, 1450 Winchester Dr., Muskegon, Mich.

SWAP — Unused Hickok 215 VTVM with AC-DC probe, and Lencore transistor tester for a good 5" push-pull scope. Robert Crush, R 2, Bethlehem, Pa.

WANTED — TV field strength meter. Must be reasonable. Carrol Davis, Walnut, N. C.

WANTED — Dial scale or escutcheon C148773 for Crosley radio model 11-106 chassis 302 or info to obtain same. W. Wright, 123 Putnam Ave., Freeport, N. Y.

FOR SALE — Communications rcvr., Heathkit AR-3, less than 20 hours operation, $23. L. C. Vierno, 114 Brookside Ave., Cresskill, N. J.

SWAP OR SELL — Sextant, bubble type, AN5854-1 for good 5" scope or reasonable cash offer. James Mariani, 549 W. 113 St., New York, N. Y.

WANTED — Sig. gen. and tube checker in good cond. Also scope. State cond., make, model, and lowest acceptable prices. Thomas Barni, 5329 Pattison Ave., St. Louis 10, Mo.

FOR SALE — Meissner 4E Hi-Fi tuner, excel. cond., $20 FOB. J. Phennicie, Jr., 1505-14th Ave., S.W., Cedar Rapids, Iowa

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SELL OR TRADE — NRI Professional TV Servicing course complete with kits, $90 cash. Milan Rafayko, 180 Winston, Lexington, Ky.

FOR SALE — HRO 5 rcvr. with Heath Q multiplier BS coils covering 80, 40, 20, 15, gen. coverage 160 and 10 meters. Power supply and speaker included, $145 fob. Morris Goodman 2621 Burns Pl., Union, N. J.

FOR SALE — FME tape recorder, Heath AR-2 rcvr, test equip., Sams Photofacts. Avon TV and Radio, 37541 Lorie Blvd., Avon, Ohio.

WANTED — Old books, magazines, catalogs on radio and electrical, also old tubes, radios, parts. Must be at least 20 years old. Describe and give price. John Haynes, Doe Run, Mo.

SELL OR TRADE — Heathkit TS-4A alignment gen. for 20 w. ampl and Heath BG-1 bar gen. for ? George Stout, 225 E. Alton, Independence, Mo.

FOR SALE — Phone patch, per Sept. '56 CQ article. $8.95, plus $1 shipping. Herbert Greenberg, 821 Rutgers Rd., Franklin Sq., N. Y.

SELL OR TRADE — 2 Raytheon 17" portable TV sets for 12 v. mobile rcvr. or xmitter. Walter Printz, 1177 E. 14th St., Brooklyn 30, N. Y.

TRADE — 2 fish tanks for xmitter over 100 w. or good rcvr. Local only. Stanley Buckwalter, 61-41 Saunders St., Rego Park 74, N. Y.

FOR SALE — TV shop accumulation: Precision 10-12 tube checker, E200C gen., Sams' literature, solder gun, tools, etc. A. Shapiro, 1786 Bedford Ave., Brooklyn 25, N. Y.

WANTED — Old radio speaker horn, swan neck type that sat on top early battery radios, also RCA table model phonograph with large tin morning glory horn. G. Lance, 1538 No. 16th St., Omaha 10, Neb.

WANTED FOR CASH — BC-923 FM rcvr., with or without dynamotor and Magnecorder, with or without amplfier. Give full particulars. R. Knaff, 542 Foxhall Pl., SE, Washington 20, D. C.

SWAP — Hand crank Gibson Girl xmitter, for sending out SOS for Hickok 288-X or 225 VTVM. K. A. Walls, 28 Walnut St., Brockton, Mass.

SWAP — Webster wire recorder 180-1, QST 1924-1950, 250 copies, LM freq. meter, auto graflex 3¼ x 4¼ B and L Tessar for Hi-Fi audio, FM tuner. H. F. Bates, 10 Beaver Dam Rd., Scituate, Mass.

WANTED — Unused 4½" sq. standard brand 0-20 and 0-50 microammeters; Millen 28801 differential capacitor; UTC-CVM3 modulation transformer. Have perfect equip. for trade including deluxe vapor type insect killer. E. Dudis, 273 N. American Blvd., Vandalia, Ohio.

WANTED — Simpson 383A capacohmeter, Hickok 209A or similar equip., also good VOM. Send full details. Vlad Hamata, Schuyler, Neb.

SELL OR SWAP — Sylvania 216 sig. gen., 500 TV sweep gen., 400 7" scope, l. n., and inst., Radion 5000 UHF-VHF battery sig. strength meter, exc. with inst. UHF converters, etc. Write for info. R. T. Whitaker, Bishop, Tex.

FOR SALE — BC312-C SW rcvr. 1500 kc-18mc converted 110 VAC RF and AF gain controls separated. Local only, $65. Henry Paskin, 63-04 Forest Ave., Ridgewood 27, N. Y.

FOR SALE — Hickok 690 VHF UHF xtal controlled marker calibrator, $100; model 650 TV gen. with color adapter kit, $100, l. n. George Cass, 32 E. Concord, Kansas City 12, Mo.

SELL OR TRADE for coins — Sams Photofacts, 1 to 211, 230 and 235, 311 to 318, 328 to 358, and some duplicates. Morris TV and App., 404 Second St., Shenandoah, Va.

WANTED — Globe Scout, Chief; AT-1, DX35; 75A1; SX-24 and 25, S40 and 53; 30-40 w. modulator; 2 meter rigs and high powered home brew xmitters. Steven Thoreson, Ellsworth, Iowa.

SELL OR SWAP — Voltage booster, $15 or Rider manuals 9 and 14 plus voltmeter. Need good personal transistor port. radio. Burt Kaufman, Box 252, Boston 35, Mass.

FOR SALE — Unused Stancor ultra-linear hi-fi output transformer replacement Williamson & Heath amplifier, $10. H. W. Bartsch, R 1, Milton, N. Y.

FOR SALE — Garage door radio control, transmitter and rcvr., 456 Mc, $30 a pair; Masco intercoms 5 station masters, $17.50, substations, $3 ea. Other items, send for list. Edward Galovic, 86 Egbert Rd., Bedford, Ohio.

WANTED — Electrostatic volt meter to 20,000 v scale. Donald Stipp, R 1, Box 79, Ukiah, Calif.

FOR SALE — TBS 50 D Harvey Wells xmitter complete with matching VFO and APS power supply, $100 plus delivery. Charles Westervelt, 89-21 215th St., Queens Village 8, N. Y.

WANTED — Panoramic adapter. Will pay cash or swap radio equip., books, etc. Peter DalCorobbo, 10441 Corliss Ave., Chicago 28, Ill.

SWAP — Unused Precision 107C geiger counter for best offer or late Sams or Rider manuals or sets. John Martin, Box 847, Anaconda, Mont.

FOR SALE — Perfect xmitting tubes types 250TH, 4X150A, 4-125A, 4-65A, 813, 829B, 2C39A, 2E24's. What am I offered? F. Jankauskas, Crum Lynne, Pa.

SELL OR SWAP — 110 VDC to 110 VAC, 250 w. Electronic Convertor model 262, perfect. Best offer. Nick Sydoryk, 2N251 Howard, Elmhurst, Ill.

FOR SALE — SX-99, excellent cond., $110, without R46-B speaker, $100. Also xtal controlled 6-meter broad-band converter, 1 microvolt sensitivity; 7-11 Mc. IF out. with tubes, xtal, $10. Claude Zucca, 1220 Commonwealth Ave., Bronx, N. Y.

SELL OR SWAP — RCP 804 tube and set tester, VHF field strength meter, BT Labs converter, A-200 sig. gen., 829B and 815. All A-1 cond. Want ham xmitter. Peter Kamarchik, Box 46, Madison, Pa.

SELL OR SWAP — TV and radio tubes for amateur gear, tape recorder, or ? Clyde Ditto, Plattsburg, Mo.

WANTED — Diagram of Supreme 580 sig. gen. Ron, 537 Rosehill, Cumberland, Md.

TRADE — NRI 88 RF-AF gen., Heath battery eliminator, vibrator checker, and 0-8 scope. Want Heath 0-11 scope. C. W. Chastain, 228 Timber Lane, Memphis 12, Tenn.

WANTED — Geiger counter. Have amplifier, and transistor tape recorder to trade. Fred Keller, Memory Lane, Linlithgo, N. Y.

BEST OFFER — Heath LG-1 factory calibrated, Knight-in-circuit capacitor tester. Jean Blanton, Box 158, Dahlgren, Va.

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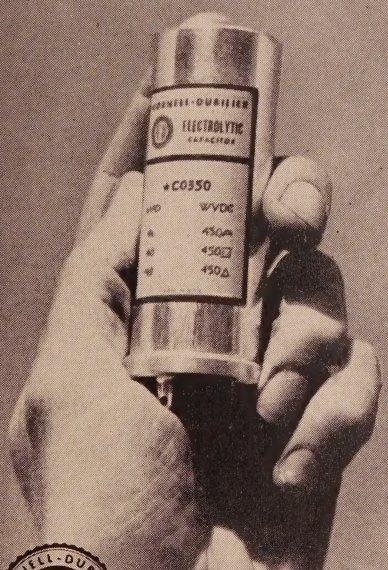

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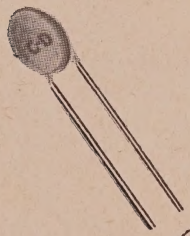

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